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OIPE NOV 16 2005 PATENT & TRADEMARK OFFICE

Application Number	09/992,051
Filing Date	NOVEMBER 21, 2001
First Named Inventor	KEVIN M. FERGUSON
Art Unit	2614
Examiner Name	Trang U. Tran
Attorney Docket Number	7217 US

Total Number of Pages in This Submission: 11

ENCLOSURES (Check all that apply)

- [x] Fee Transmittal Form
- [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) _____
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below): RETURN POST CARD

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	TEKTRONIX, INC.		
Signature	Francis I. Gray		
Printed name	FRANCIS I. GRAY		
Date	NOVEMBER 11, 2005	Reg. No.	27,788

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Typed or printed name	Pauline L. Bradley	Date	November 11, 2005

PTO/SB/17 (12-04v2)
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($)	500.00

Complete if Known	
Application Number	09/992,051
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METHOD OF PAYMENT (check all that apply)

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____ x	_____ =	_____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____ x	_____ =	_____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____ / 50 =	_____ (round up to a whole number) x	_____ =	_____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): APPEAL BRIEF	$500.00

SUBMITTED BY

Signature	Francis I. Gray	Registration No. (Attorney/Agent) 27,788	Telephone 503-627-7261
Name (Print/Type)	FRANCIS I. GRAY		Date NOVEMBER 11, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **KEVIN M. FERGUSON**

Art Unit: **2614**

Serial No.: **09/992,051**

Examiner: **Trang U. Tran**

Filed: **November 21, 2001**

For: **HUMAN VISION MODEL BASED SLOW MOTION INTERPOLATION**

November 11, 2005

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

This is an appeal from the Examiner's decision dated July 1, 2005 finally rejecting claims 1-6, the only claims in this case.

Real Party in Interest

The real party in interest is Appellant's assignee, Tektronix, Inc., an Oregon corporation.

Related Appeals and Interferences

There are no other prior or pending appeals, interferences or judicial proceedings known to Appellant or Appellant's legal representative or assignee which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1-6, the only claims in this case, stand finally rejected, and are the claims being appealed.

Status of Amendments

No amendments to the claims were filed subsequent to the Examiner's final rejection.

Summary of Claimed Subject Matter

The present invention relates to video rate conversion that provides a human vision model based slow motion interpolation to render smooth interpolated video from a slower rate video source. (Page 1, lines 6-8) Referring to Fig. 1 a slower rate video signal is input

to a frame rate converter **12** that up-samples the slower rate video signal to a desired higher rate video signal. The higher rate video signal is then input to a three-dimensional human vision model adaptive filter **14** to produce a temporally smooth interpolated video signal at the higher rate. An optional DC restore circuit **16** determines the DC level for the slower rate video signal and adds that to the temporally smooth interpolated video signal at the higher rate. (Page 2, line 20 - page 3, line 16) The adaptive filter has a recursive filter architecture that results in the smooth interpolated video signal from the up-sampled higher rate video signal. (Page 3, lines 17-24)

Grounds of Rejection to be Reviewed on Appeal

Claims 1-6 have been rejected under 35 U.S.C. 102(e) as being anticipated by Watson (USP 6,493,023).

Argument

35 U.S.C. 102(e) provides in pertinent part that "[A] person shall be entitled to a patent unless . . . the invention was described in . . . a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent . . ." It is axiomatic that to anticipate a claim a prior art reference must show each and every element claimed. *General Electric Co. v United States*, 198 USPQ 65, 85 (1978)

Discussion of Reference:

Watson discloses a digital video quality (DVQ) apparatus that incorporates a

model of human visual sensitivity to predict the visibility of artifacts. The input to the DVQ is a pair of color image sequences – an original sequence and a processed sequence. Both sequences are sampled, cropped and subjected to color transformations. Then the sequences are subjected to blocking and discrete cosine transformation (DCT), with the results being transformed to local contrast. A time filtering operation that implements the human sensitivity to different time frequencies is performed and the results are converted to threshold units by dividing each DCT coefficient by its respective visual threshold. Then the two sequences are subtracted to produce an error sequence that is subjected to a contrast masking operation. The masked errors are pooled and converted to a visual quality measure.

Claims 1, 3 and 5

The Examiner asserts that the claimed up-sampling of the slower rate video signal to the desired rate is met by the sampler **30** that up-samples the chrominance components of a Y, Cb, Cr video signal from a 4:2:2 format to a 4:4:4 format, i.e., to a common resolution for all video components of the video signal, before color conversion and that the claimed HVM adaptive filtering is met by the time filter **42** that temporally filters the local contrast signals, the time filter being a second-order IIR filter. The Examiner further asserts that the claimed DC restoring is met by the DCT thresholds which are computed for each color and DCT frequency.

Applicant recites in claims 1, 3 and 5 providing a smooth interpolated video signal at a desired rate from a slower rate video signal by initially up-sampling the slower rate

video signal to the desired rate. The Examiner takes the position that up-sampling the chrominance components of the video signal to have a common resolution for all components of the video signal is equivalent to the up-sampling of the slower rate video signal to the desired rate, i.e., the Examiner is asserting that each component of the video signal is equivalent to the claimed "slower rate video signal." However one who has read the specification and is of ordinary skill in the art does not equate components of a video signal to the video signal itself. Especially since the specification states that the presently claimed invention relates to "format conversion between PAL (25 frames per second) to NTSC (30 frames per second), between film (24 frames per second) and one of the television standards, and for presenting slow motion video sequences where the input frame rate is reduced" and that the slower rate video signal "is input to a frame rate converter **12** that up-samples the slower rate video signal to a desired higher rate video signal." The up-sampling recited by Appellant deals with frame rate up-sampling, not up-sampling of video components to a common resolution. Claim 3 specifically recites a frame converter for the up-sampling function.

Appellant next recites that the up-sampled slower rate video signal is then adaptively filtered using a human vision model to produce the smooth interpolated video signal. The Examiner takes the position that temporal filtering of local contrast signals, which signals are converted from DCT coefficients to units of local contrast, is equivalent to the claimed adaptive filtering of the up-sampled slower rate video signal. But Watson does not filter a video signal, but rather filters a signal that is derived from DCT coefficients. No one of ordinary skill in the video arts would deem such a local contrast signal as an up-sampled slower rate video signal. It is not the up-sampled chrominance

component that is filtered by the time filter of Watson, but data derived from such up-sampled component after several further processing steps. The Examiner ignores the fact that after color transformation, block construction, DCT processing and conversion to local contrast there is no video signal, up-sampled or not, that is input to the time filter of Watson. Certainly the output from the time filter of Watson is not a "smoothed interpolated video signal."

Therefore Appellant submits that Watson neither teaches nor suggests to one of ordinary skill in the art the steps of up-sampling a slower rate video signal to a desired rate (frame rate conversion) and then adaptively filtering the up-sampled slower rate video signal using a human vision model to produce a smooth interpolated video signal. Nowhere in Watson is a smooth interpolated up-sampled chrominance signal produced, which would be necessary by the Examiner's reasoning to produce the invention as recited by Appellant in claims 1, 3 and 5.

Claims 2, 4 and 6

Appellant recites further that a direct current level is restored for the smooth interpolated video signal, and specifically in claim 4 that a DC (direct current) restorer has as inputs the smooth interpolated video signal from the adaptive filter and the up-sampled video signal. The Examiner asserts that the claimed DC restoring is met by the DCT (discrete cosine transform) thresholds that are computed for each color and DCT frequency. But the Examiner does not indicate how such DCT thresholds, or contrast thresholds, restore a DC level to a video signal. In fact the thresholds of Watson are the

product of a summation factor S and three functions, one of the color component c, one of the orientation of the DCT frequency and independent of color, and one a Gaussian function of DCT radial frequency whose parameters depend upon color and further upon the horizontal and vertical processing resolutions. Appellant fails to see how the Examiner could come up with any DC levels from this computation. Further Appellant does not see that any values are added to a video signal, which is required to restore a DC level (as is well known to one of ordinary skill in the art).

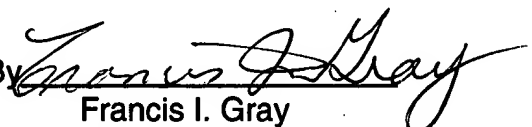
Therefore Appellant submits that Watson neither teaches nor suggests to one of ordinary skill in the are the step of restoring a direct current level for the smooth interpolated video signal.

Conclusion

In view of the above argument Appellant requests that the Examiner's rejection of claims 1-6 be reversed as being neither anticipated nor rendered obvious to one of ordinary skill in the art by Watson, and that this case be passed to issue.

Respectfully submitted,

KEVIN M. FERGUSON

By 

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Claims Appendix

1. An apparatus for providing a smooth interpolated video signal at a desired rate from a slower rate video signal comprising:

means for up-sampling the slower rate video signal to the desired rate; and

means for adaptively filtering the up-sampled slower rate video signal using a human vision model to produce the smooth interpolated video signal.

2. The apparatus as recited in claim 1 further comprising means for restoring a direct current level for the smooth interpolated video signal.

3. An apparatus for providing a smooth interpolated video signal at a desired rate from a slower rate video signal comprising:

a frame converter for up-sampling the slower rate video signal to produce an up-sampled video signal at the desired rate; and

an adaptive filter based on a human vision model for interpolating the up-sampled video signal to produce the smooth interpolated video signal.

4. The apparatus as recited in claim 3 further comprising an direct current restorer having as inputs the smooth interpolated video signal from the adaptive filter and the up-sampled video signal for restoring a direct current level in the smooth interpolated video signal.

5. A method of providing a smooth interpolated video signal at a desired rate from a slower rate video signal comprising the steps of:

up-sampling the slower rate video signal to the desired rate to produce an up-sampled video signal; and

adaptively filtering the up-sampled video signal according to a human vision model to produce the smooth interpolated video signal.

6. The method as recited in claim 5 further comprising the step of restoring a direct current level in the smooth interpolated video signal as a function of the up-sampled video signal.